Progress Notes **Canadian Wildlife Service**

Également disponible en français

Progress Notes contain timely data and conclusions and are presented as a service to other wildlife biologists and agencies.

No. 196, December 1991

History and current status of the Loggerhead Shrike in Quebec

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Introduction

In the past 20 years, concern has been raised about the status of the Loggerhead Shrike *Lanius ludovicianus* in certain parts of the United States and Canada (Graber et al. 1973; Campbell 1975; Cadman 1985; Luukkonen 1987; Novak 1989; Brooks and Temple 1990). Moreover, data from the Breeding Bird Survey and the Christmas Bird Count (Geissler and Noon 1981; Morrison 1981; Robbins et al. 1986) in addition to the National Audubon Society's Blue List, published in *American Birds* (Tate 1986), have shown that the shrike is in a precarious situation in a number of regions in its range. The Loggerhead Shrike is one of the species that has suffered the severest decline in several parts of North America, particularly in areas east of the Great Plains (Morrison 1981; Luukkonen 1987; Cadman 1990), and it is currently considered threatened or endangered in several midwestern and eastern states as well as in Canada.

In Canada, the Loggerhead Shrike was designated a threatened species by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in the mid-1980s (Cadman 1985). Following a reassessment of the situation, however, the subspecies *L.l. migrans*, which occurs in southeastern Manitoba, southern Ontario, and southern Quebec, was recently classified as endangered (Cadman 1990). This reassessment was justified by the fact that the status of the species in Canada varies substantially from one region to another and that in the short term, the eastern population is clearly more likely to disappear than the western population.

In Quebec, the Loggerhead Shrike was designated an endangered species in the late 1980s (Robert 1989). As a result, the Quebec regional office of the Canadian Wildlife Service (CWS) developed a provincial recovery plan and conducted a survey of breeding shrikes in southern Quebec (Robert and Laporte 1991). The purpose of this report is to summarize the data collected by CWS in recent years. It contains

(1) information compiled to date on the history of the Loggerhead Shrike in Quebec,
(2) results of surveys conducted in Quebec in 1989 and 1990, and
(3) data on changes to Quebec's agricultural landscape since establishment of the Loggerhead Shrike in southern Quebec and on the possible effects of these changes on the status of the species in the province.

Methods

History and population trends

The data on the history of the species were taken from a variety of sources. Many sight records and breeding records were published in the latter half of the 1800s and the early 1900s in natural science or ornithology journals (e.g., *Canadian Sportsman and Naturalist, Canadian Naturalist and Geologist, Canadian Field-Naturalist, Auk*). In addition, a number of books published during that period provide information on the status of the Loggerhead Shrike in certain regions of southern Quebec. They include *The birds of Montreal*, by E.D. Wintle (1896), and *Les oiseaux de la province de Québec*, by C.-E. Dionne (1906). In addition to published data, we had access to various manuscripts and personal notes by Quebec ornithologists who were very active at the turn of the century. The records were taken primarily from the personal notes of Lewis McIver Terrill, but also from a manuscript by Henry Mousley and notes compiled by Alfred Garneau and Victor Gaboriault. A number of historical breeding records were also compiled using data from the egg collections of the Canadian Museum of Nature (Ottawa) and the now defunct Institution des Sourds-Muets de Montréal.

The breeding records and information on the status of the species over the past 50 years were taken primarily from the following publications: the annual report and newsletter of The Province of Quebec Society for the Protection of Birds, the *Bulletin ornithologique* of the Club des ornithologues du Québec, *Les oiseaux des collines montérégiennes et de la région de Montréal* (Ouellet 1974), and *État et distribution des oiseaux du Québec méridional* (David 1980). We also obtained several records through the Quebec Nest Record Card Program (Canadian Museum of Nature) and from preliminary data for the Quebec breeding bird atlas (CWS).

Population trends in recent decades were determined using data from the ÉPOQ database (Étude des populations d'oiseaux du Québec). This database is managed by the Association québécoise des groupes d'ornithologues, which compiles records from the daily checklists used by Quebec ornithologists since 1948. At present, the database contains roughly 2 million records, from some 150 000 checklists. By examining the annual frequency of occurrence, that is, the percentage of checklists in which the species is recorded in a given year, we can evaluate the population trends of the Loggerhead Shrike in Quebec (Larivée 1989). For each year, we analyzed only the checklists for May, June, July, and

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92-01856/

August in order to avoid records resulting from erroneous identifications made in March and April, when both the Loggerhead Shrike and the Northern Shrike *L. excubitor* are present in southern Quebec (Robert 1991). The annual frequency of occurrence was calculated beginning in 1969.

Fieldwork

In 1989, the field investigations were restricted to visiting the main sites at which breeding of Loggerhead Shrikes had been reported from 1974 to 1988 and to verifying the records of Quebec ornithologists.

In 1990, we attempted to inform as many ornithologists as possible of the need to immediately report their records of Loggerhead Shrikes to us. The information was disseminated in a variety of forms, the most important being the publication of a notice in *Québec Oiseaux*, which has a circulation of 5500 across the province. Various ornithological groups not likely to have seen the notice were informed directly. All credible records were checked in the field. In 1990 we also surveyed several sectors in southern Quebec. Our objective was to prepare a list of as many breeding pairs as possible. The survey technique consisted of slowly driving along all secondary roads in a 100-km² sector (10 × 10 km), stopping for a short time (5–20 min) in habitats suitable for the breeding of shrikes. In areas with little traffic, the observer drove at a speed of 30–50 km · h^{-1}. On certain stretches of road, however, he had to drive more quickly. The location of the plots surveyed was determined on the basis of the UTM (Universal Transverse Mercator) projection on 1:50 000 and 1:250 000 topographical maps of Energy, Mines and Resources Canada. All secondary roads in an area of approximately 13 000 km² (from 159 plots measuring 10 × 10 km) were surveyed using this method between April 19 and July 6, 1990. The plots were selected so as to sample all regions in Quebec that were potentially suitable for the breeding of Loggerhead Shrikes. Plots surveyed were located in the Eastern Townships, the foothills of the Laurentians (as far as Cap Tourmente), the Ottawa valley, and St. Lawrence lowlands. Some of the plots were only partly surveyed because they contained almost no suitable breeding areas. We were thus able to devote more time to the more suitable sectors. All plots in which breeding of Loggerhead Shrikes had previously been reported were visited. In addition, all precisely identified breeding sites were checked.

Changes in Quebec's agricultural landscape

A number of statistics on agriculture in Quebec were compiled and analyzed in order to determine the possible importance of agricultural changes on the establishment and decline of the Loggerhead Shrike in Quebec. Data on the areas under pasture and under crops in the nineteenth and twentieth centuries were taken from the statistics published in the *Statistical yearbook*, *Quebec yearbook*, *Le Québec statistique*, and *Canada yearbook*.

Results and discussion

History and population trends

At one time, the Loggerhead Shrike was absent from Quebec and surrounding regions. It established itself in the province in the 1800s. According to Caulfield (1890), it may have been absent from the Montréal region during the 1850s and early 1860s. However, analysis of the literature (D'Urban 1857; Vennor 1860) indicates that a number of shrike records were reported in the Montréal region in summer in the late 1850s. Vennor (1860, p. 427) describes the status of the Northern Shrike in the Montréal region in winter as follows:

> This bird is not a winter resident, but a loiterer. A few straggling ones may be seen as late as January. During the cold weather it feeds on mice, and other small animals. It is rare here, both in summer and winter.

Vennor was probably confusing the two North American species of shrike. The "stragglers" to which he refers were probably Northern Shrikes; however, the shrikes present in summer must have been mainly Loggerhead Shrikes. Like Vennor (1860), D'Urban (1857), who does not discuss the Loggerhead Shrike in his publication on the winter birds of Montréal, also refers to Northern Shrikes as loiterers. In addition, he states that the spring arrival of the Northern Shrike takes place around April 13. Like Vennor, he was apparently confusing the two species of shrike. On the basis of previous observations, it can be assumed that the Loggerhead Shrike was a summer visiter to the Montréal region in the late 1850s and that some birds bred there, particularly since during this same period the breeding of the species in southern Ontario was first confirmed (Cadman 1985).

The first evidence of breeding in Quebec is provided by Ernest Wintle, a Montréal ornithologist. It can be easily deduced from his publications that certain Northern Shrike breeding records are erroneous and refer instead to Loggerhead Shrikes. Thus, we know that the Loggerhead Shrike bred in the vicinity of Mount Royal in 1880 (Wintle 1881, 1882), although it was not until 1883 that Wintle reported breeding records of this species (Wintle 1884). Moreover, given the fact that the species was already quite common in the 1880s and 1890s (Wintle 1884, 1896) and given the records mentioned in the preceding paragraph, we can deduce that it had certainly previously bred in southwestern Quebec, either in the 1860s or 1870s.

It would appear, therefore, that in the 1800s many shrikes occurred and bred in the southwestern part of the St. Lawrence lowlands. According to Wintle (1896), the species was common in the Montréal region at that time. This would appear entirely plausible based on the personal notes of L.M. Terrill, an ornithologist and contemporary of Wintle's, who was very active in the Montréal region. His

personal notes contain many breeding records; from 1897 to 1930, he found more than 150 active Loggerhead Shrike nests in Montréal and the surrounding area. Moreover, according to his notes, he regularly found two to five nests on a single day in the field. Given the observation techniques and modes of transportation available to ornithologists at that time, it can be inferred that the Loggerhead Shrike was common in the late 1800s and first three decades of the 1900s, at least in the greater Montréal region. It should also be pointed out that in the late 1800s, the species' range was not limited to the Montréal vicinity; nests were found in the Eastern Townships (Bury, Massawippi, and Hatley) and in the Ottawa valley (Hull) as early as the late 1800s (Robert and Laporte 1991). According to H. Mousley (unpubl.), this bird was a "fairly common summer visitant" in the Hatley region in the early 1900s.

The Loggerhead Shrike's range continued to expand until the 1930s or 1940s (Lewis 1920; Bull 1974; Cadman 1985). The species was absent from the Quebec City region in the early 1900s (Dionne 1906) but later bred there and to the east (e.g., in Kamouraska in 1934). In recent decades, its breeding range has included the Ottawa valley, the Laurentian foothills (as far as Cap Tourmente), the Eastern Townships, and the St. Lawrence lowlands upstream from Rimouski (Robert and Laporte 1991). Although sightings have also been reported in other parts of Quebec (Abitibi, Saguenay–Lac Saint-Jean, and Gaspé), there are no breeding records for these areas (David 1980).

A relatively large number of Loggerhead Shrikes appear to have bred in Quebec from the late 1800s to the 1930s or 1940s. Ouellet (1974) estimates that the population in the Montréal region remained relatively stable until the late 1950s. According to the newsletters and annual reports of The Province of Quebec Society for the Protection of Birds, however, the decline in Loggerhead Shrike populations was first observed in the late 1940s (Terrill and Fry 1946; Montgomery et al. 1948; Terrill 1950). The two most interesting comments in this respect are as follows: "Migrant Shrikes (on the other hand) have been somewhat less common, being absent in recent years from many of their former nesting haunts" (Terrill and Fry 1946, p. 32), and "This shrike has been decidedly scarce for a number of years in comparison with its former numbers" (Terrill 1950, p. 42).

It should be noted that at that time, the annual report was written by L.M. Terrill, the same L.M. Terrill who had found several nests daily at the turn of the century. It can thus be assumed that this evaluation was based on Terrill's 50 years of experience and knowledge of the species. It would appear, therefore, that population numbers began to decline, at least in Montréal region, in the 1940s. The decline continued so steadily that over the course of several decades, the shrike became one of the rarest birds in Quebec. In 1970, it was already considered a rare summer visiter (David 1980). Records from the ÉPOQ database show this decline. The annual frequency of occurrence of the Loggerhead Shrike has gradually fallen over the last 20 years (Fig. 1).

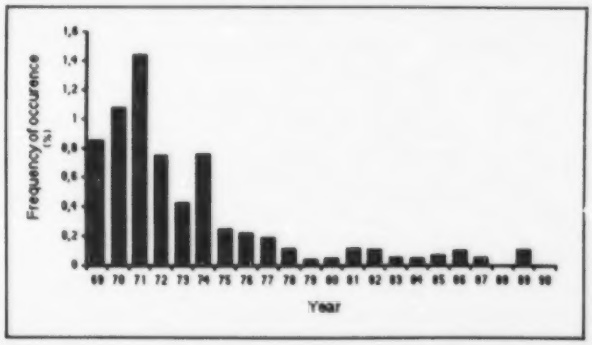
Fieldwork

In 1989, 12 historical breeding sites were visited, and no shrikes were seen. Eight records were reported to us by Quebec ornithologists, two of which were breeding records. The other records resulted from inaccurate identifications or the observation of transient birds. The two breeding pairs reported in 1989 were sighted in Champlain and Mégantic counties.

In 1990, eight records were reported to us, only two of which might have been Loggerhead Shrikes. These two records were checked in the field, with no success. All other records were the result of erroneous identifications. In the survey of the fifty or so plots where breeding has been reported in the past, no Loggerhead Shrikes were sighted. The survey of the other plots resulted in the sighting of a single breeding pair, in Portneuf county.

Therefore, the total results of the field studies on breeding shrikes were two pairs in 1989 and one pair in 1990. It is clearly very difficult to determine how many Loggerhead Shrikes are still breeding in southern Quebec on the basis of these results. In addition to the sites observed in 1989 and 1990, we know that the species has bred at about ten different locations since 1980. However, breeding has never been reported at more than two different sites in a given breeding season (Robert and Laporte 1991). Given the effort devoted to the fieldwork in 1990, it seems reasonable to state that Quebec currently has at most about ten breeding pairs. This number is only a tiny fraction of previous populations, which, according to the most likely estimates, totalled several hundred or several thousand breeding pairs.

Figure 1
Annual frequency of occurrence[a] of the Loggerhead Shrike since 1969 as documented in the ÉPOQ database



[a] Annual frequency of occurrence is the percentage of daily checklists in which the Loggerhead Shrike was recorded in May, June, July, or August for each year.

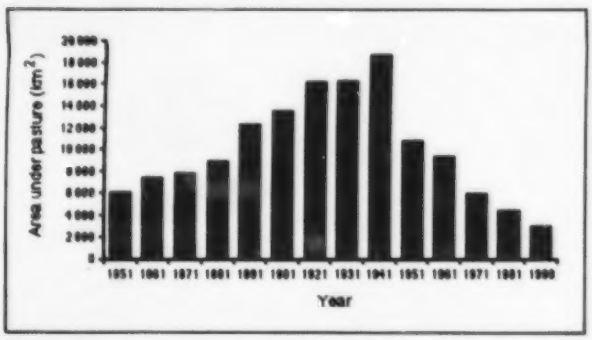
Changes in Quebec's agricultural landscape

The establishment of the Loggerhead Shrike in southern Quebec, like elsewhere in the Northeast, is associated with the clearing of forests in the last century (Palmer 1898; Mousley 1918; Lewis 1920). The rapid development of agriculture during this period was a major factor in the clearing (Clawson 1979). In Quebec, the agricultural crisis in the first half of the 1800s, closely related to the decline in wheat production, was followed by a gradual shift in agriculture to dairy farming and by a move away from subsistence farming to commercial farming (McCallum 1980; Monette 1980; Perron 1980). According to Monette (1980), farming in Quebec shifted toward new agriculture practices in which crops to feed livestock, particularly grass and pasture crops, accounted for a large percentage of farmland. In short, the forests of the St. Lawrence plain have increasingly been replaced by open agricultural fields.

Quebec statistics on the area under pasture and under crops in the past 150 years clearly illustrate the increasing percentage of farmland occupied by open fields (Figs. 2 and 3). The very rapid increase in pastureland at the turn of the century may have contributed significantly to the establishment of the Loggerhead Shrike in southern Quebec. The species regularly visited these areas during the breeding season, probably because it could feed there more easily than in areas where the herbaceous cover grew throughout the summer (Luukkonen 1987; Novak 1989). Figure 2 shows that, generally speaking, the areas occupied by pastureland and the numbers of Loggerhead Shrikes have followed a similar trend since the shrike became established in Quebec. For instance, the first indications of population decline in the late 1940s coincide with the period of most significant decline in the area of pastureland. The gradual disappearance of the shrike in the past few decades seems to coincide with the disappearance of pastureland.

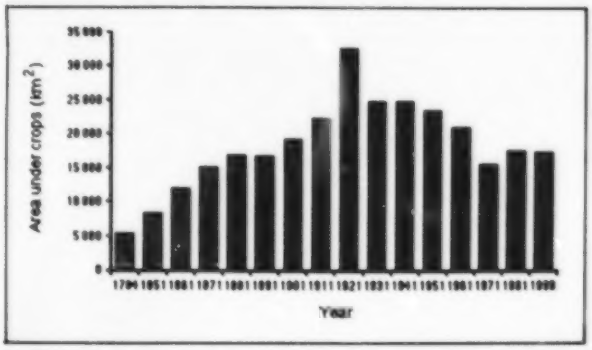
The changes in agriculture in Quebec not only resulted in a decline in the area of pastureland but also brought about significant changes in the development of farmland. The current pattern of the agricultural landscape differs considerably from previous use patterns, and these changes may have contributed to the decline in the Loggerhead Shrike in Quebec. The shift away from subsistence farming to commercial production in the last 150 years has resulted in a gradual decline in the number of small family farms and in the farming population. Much marginal farmland has thus been abandoned or has been urbanized, while, on the other hand, the average area of farms has increased considerably (Bernier 1980; Monette 1980). Moreover, owing to the mechanization of farming, the areas cultivated are now much larger than they once were. They are also, in most cases, denuded and lack shelterbelts. The mosaic of small fields which were previously divided almost equally between pasture and cropland has been replaced by large fields where the proportion of pasture is now no more than roughly 15%. In short, we believe that southern Quebec is less suitable to the breeding of Loggerhead Shrike today than it previously was, not only because of the disappearance of pastureland, but also because of the larger average area under cultivation, the predominance of corn fields, the gradual removal of shelterbelts, and the return of poor agricultural lands to forest. Of course, these changes alone do not explain the decline in Loggerhead Shrike in Quebec, since many environments that appear suitable to the establishment of this species still exist. We believe, however, that these changes have contributed to the gradual disappearance of the Loggerhead Shrike from Quebec.

Figure 2
Area under pasture in Quebec since the mid-1800s[a]



[a] Data taken from *Statistical yearbook*, *Quebec yearbook*, and *Le Québec statistique*, Bureau de la statistique du Québec; and from *Canada yearbook*, Statistics Canada (previous titles: *Yearbook and almanac of British North America*, *Yearbook and almanac of Canada*, *Canada statistical abstract and record*, and *Statistical yearbook of Canada*.)

Figure 3
Areas under crops in Quebec since the late 1700s[a]



[a] Data taken from *Statistical yearbook*, *Quebec yearbook*, and *Le Québec statistique*, Bureau de la statistique du Québec; and from *Canada yearbook*, Statistics Canada (previous titles: *Yearbook and almanac of British North America*, *Yearbook and almanac of Canada*, *Canada statistical abstract and record*, and *Statistical yearbook of Canada*.)

Acknowledgements

The authors would like to thank Henri Ouellet and Michel Gosselin of the Canadian Museum of Nature for allowing us access to the Quebec Nest Record Card Program, to the museum's egg collection, and to the personal notes of L.M. Terrill and V. Gaboriault. We would also like to thank the Association québécoise des groupes d'ornithologues for giving us access to the ÉPOQ database and for publishing a notice to ornithologists in *Québec Oiseaux*. Jean-Marie Perron, from Laval University's museology centre, gave us access to the notes of A. Garneau, and Raymond McNeil, from the University of Montréal, gave us access to the manuscript of H. Mousley. We are indebted to them for their cooperation. Lastly, we would like to convey our thanks to Alain Demers for his participation in the fieldwork.

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Published by Authority of the Minister of Environment
©Minister of Supply and Services Canada, 1991
Catalogue No. CW69-9/196E
ISBN 0-662-19254-0
ISSN 0069-0023